



The Statistical Cycle

Background

In this activity, you will use the stages of the statistical cycle to carry out an investigation and report on your findings. Your data must come from the 2012 CensusAtSchool.



STEP 1: The Problem

The first step when using the statistical cycle, is to decide on the topic of your investigation

e.g. what is the 'problem' you will investigate?

In this case your data must be numerical and compare the results of at least two distinct categories.

For example:

Sex: Do boys have faster reaction times than girls?
Sexes (boys vs girls) are the distinct categories; reaction time is the numerical data.



Breakfast: Do cereal eaters have better concentration than students who don't eat

breakfast?

Breakfast types (cereal vs no breakfast) are the distinct categories; concentration time is the numerical data.

Travel time: Do Canadian students take longer to get to school than Australian students?

Countries (Canada vs Australia) are the distinct categories; length of time is the numerical data.

- a)** Choose the problem you want to investigate and tell your teacher. Now, write your investigation in the form of a question, like the examples above.
- b)** Define the key terms of your investigation question e.g. 'height' means height measured in cm without shoes.
- c)** Explain what you already know about your chosen problem, and what you want to find out.

STEP 2: The Plan



The second step in the cycle involves making the decisions about your data e.g. how big should your sample be? How will your sample be chosen? You also need to think about what you expect to find so that you are ready to talk about any unexpected results.

- d)** What results do you expect to find? Write a sentence that predicts what you think the data will show you.
- e)** Look at the CensusAtSchool questionnaire and identify which questions provide the data you need to complete your investigation.
- f)** What sample size will you use? Explain your choice.

STEP 3: The Data



After defining your problem, and planning your investigation, the next step in the statistical investigation cycle is to organise the data so it is easy for you to interpret and for others to read.

- g)** How did you collect and organise the data?
HINT: The data comes as an Excel spread sheet. You can use the 'Sort' function in the data tab to order the data e.g. by year level, sex, height. This will make it easier to display the data.
- h)** Did you use all the data or did you "clean it" to eliminate any obvious errors? Explain why you did/did not clean the data. If you did clean the data, how did you decide what data to 'clean'?
- i)** What level of accuracy is appropriate for this investigation? e.g. For very spread out data you may decide to arrange it so as to contain it in 6 - 10 groups. You may decide to round off your answers. Explain your decisions.
- j)** How did you display the data? Explain your choice.
Briefly describe the characteristics of each distribution.



STEP 4: The Analysis

Once you have sourced the data to answer your investigation 'problem', the next step in the statistical cycle is to analyse what the data tell you.

- k)** Produce and clearly display your data using summary statistics.
HINT: Summary statistics are best displayed in a table.

You will need to calculate the mean, median, mode and range. You can do this in Excel by using the formulae "`=average`", "`=median`" and "`=mode`" to calculate the mean, median and mode. You can look at the mode or the modal range if your data are grouped.

STEP 5: The Conclusion



This is the final step of the statistical investigation cycle. At this stage of the cycle, you are using your summary statistics to sum up the findings of your investigation. This is also where you communicate your findings using appropriate statistical vocabulary.

- l)** What is the answer to your original question? You will need to draw on your summary statistics from 'Step 4' to provide proof.

- m)** What meaning can be taken from your results? Can your answers be generalised beyond your sample? How could your results be applied in real life? Where should they not be used, or, used with caution?